

IAP12 Rec'd PCT/PTO 16 JUN 2006

Re Point V:

1. Documents:

- D1: EP-A-1 431 773 (ROBERT BOSCH GMBH) June 23, 2004  
(2004-06-23)
- D2: EP-A-1 321 776 (HITACHI, LTD) June 25, 2003 (2003-  
06-25)
- D3: EP-A-0 758 093 (SIEMENS AKTIENGESELLSCHAFT) February  
12, 1997 (1997-02-12)
- D4: US-A-5 717 399 (URABE ET AL) February 10, 1998  
(1998-02-10)
- D5: US-A-6 137 434 (TOHYA ET AL) October 24, 2000 (2000-  
10-24)
- D6: US-B1-6 292 129 (MATSUGATANI KAZUOKI ET AL)  
September 18, 2001 (2001-09-18)
- D7: EP-A-0 919 828 (TOYOTA JIDOSHA KABUSHIKI KAISHA)  
June 2, 1999 (1999-06-02)

2. Novelty / Inventive Activity:

The present application does not satisfy the requirements of Article 33(1) PCT, because the subject matter of **Claims 1-10** in the sense of Article 33(2) PCT is not novel or not inventive (Art. 33(3) PCT).

The reasons for this are as follows:

2.1 Document D2 discloses the subject matter of **Claims 1-5, 8 and 9** as follows:

1. A radar sensor for a motor vehicle having a transmitting device and a receiving device, transmitting parameters of the transmitting device and receiving parameters of the receiving device

- being variable (Figure 1 and associated text, [0014] ff.).
2. The transmitting parameters are
    - a) the transmitting frequency and/or
    - b) the transmitting capacity and/or
    - c) the modulation amplitude and/or
    - d) the azimuthal width of the emitted field  
(Figure 1, [0014] ff.).
  3. The receiving parameters are
    - a) the receiving frequency and/or
    - b) the receiving sensitivity (= reduced range, Figure 1, [0014] ff.,) and/or
    - c) the azimuthal width of the received field  
(Figure 1, [0014] ff.).
  4. A method for controlling the transmitting and receiving parameters of the radar sensor, the transmitting parameters and/or receiving parameters being changed as a function of the driving condition of the vehicle [0034,0035].
  5. The following enter into the driving condition:
    - a) the speed and/or
    - b) assistance functions selected by the driver and/or
    - c) the position of the vehicle [0034,0035] and/or
    - d) the installation location of the radar sensor.
  8. The width and the shape of the antenna characteristic are changed (Figure 1, [0014] ff.).

9. The antenna characteristic is changed by switching elements at the high-frequency level (Figure 1, [0014] ff.).

It must be noted that even if Claims 2, 3 or 5 were restricted to variants (and/or) respectively not disclosed in D2, their subject matter in light of document D2 in an overall view with general technical knowledge or one of the documents D3-D7 is not regarded as inventive.

- 2.2 Furthermore, in combination with general technical knowledge or in combination with D6 or D7, D2 renders the features of Claims 6, 7 and 10 obvious:

6. The speed resolution of the radar sensor is changed.  
7. The distance resolution of the radar sensor is changed.

From D2, Figure 1 and the different ranges of the antenna characteristics it becomes immediately clear to one skilled in the art that switching the ranges has the consequence of a change of the speed (Doppler) and distance resolution unless in the FFT the number of bins (normally 512) is changed at the same time. For in the FMCW radar, one frequency bin of the FFT corresponds to one distance bin (or increment). Therefore, if the range is e.g. halved as in D2, then in the FFT one bin corresponds to a correspondingly halved distance increment. Thus the distance and Doppler resolution increases.

Although D2 is not explicitly geared towards FMCW systems, this is nevertheless obvious to one skilled in

the art (see e.g. D6, column 7, lines 58-65, column 14, lines 49-63 or D7, [0060]).

10. The antenna characteristic is changed by digital processing in the baseband.

This feature is also well known in the technical world. Thus D6 and D7 show a radar having digital beam shaping (D6, Figure 1, column 2, lines 30-57; D7, Figures 1, 5, [0001, 0002, 0020 ff.]).

2.3 Document D3 discloses the subject matter of **Claims 1-5 and 8** as follows:

1. A radar sensor for a motor vehicle having a transmitting device and a receiving device, transmitting parameters of the transmitting device and receiving parameters of the receiving device being variable (Figures 9a, b and column 5, line 16 through column 6, line 14).
2. The transmitting parameters are
  - a) the transmitting frequency (Figure 10, column 6, lines 19 ff.) and/or
  - b) the transmitting capacity (column 11, lines 53-56) and/or
  - c) the modulation amplitude (Figure 10, column 6, lines 19 ff.) and/or
  - d) the azimuthal width of the emitted field (Figures 9a, b and column 5, line 16 through column 6, line 14).
3. The receiving parameters are
  - a) the receiving frequency (Figure 10, column 6, lines 19 ff.) and/or

- b) the receiving sensitivity (= reduced range, column 7, line 8 ff.) and/or
  - c) the azimuthal width of the received field (Figures 9a, b and column 5, line 16 through column 6, line 14).
4. A method for controlling the transmitting and receiving parameters of the radar sensor, the transmitting parameters and/or receiving parameters being changed as a function of the driving condition of the vehicle (column 7, lines 39 ff.).
5. The following enter into the driving condition:
- a) the speed (column 7, line 39 ff.) and/or
  - b) assistance functions selected by the driver and/or
  - c) the position of the vehicle and/or
  - d) the installation location of the radar sensor.
8. the width and shape of the antenna characteristic is changed (Figures 9a, b and column 5, line 16 through column 6, line 14).

It must be noted that even if Claim 5 were restricted to variants (and/or) respectively not disclosed in D3, their subject matter in light of document D3 in an overall view with general technical knowledge or one of the documents D2, D4-D7 is not regarded as inventive.

2.4 Furthermore, in combination with general technical knowledge or in combination with D6 or D7, D3 renders the features of Claims 6-7 and 9-10 obvious:

6. The speed resolution of the radar sensor is changed.

7. The distance resolution of the radar sensor is changed.

From D3, Figure 10 (frequency response characteristic FMCW) and the different ranges of the antenna characteristics it becomes immediately clear to one skilled in the art that switching the ranges has the consequence of a change of the speed (Doppler) and distance resolution unless in the FFT the number of bins (normally 512) is changed at the same time. These connections are also dealt with in D3, column 7, lines 39-59, where the influence of the modulation rate on the distance resolution is discussed.

9. The antenna characteristic is changed by switching elements at the high-frequency level (D3, column 5, 38-42).
10. The antenna characteristic is changed by digital processing in the baseband.

These features are also well known in the technical world. Thus D6 and D7 show a radar having switching HF elements and having digital beam shaping in the baseband (FFT): D6, Figure 1, column 2, lines 30-57; D7, Figure 1, 5, [0001, 0002, 0020 ff.].

- 2.5 Document D4 discloses the subject matter of **Claims 1-5, 8 and 9** as follows:

1. A radar sensor for a motor vehicle having a transmitting device and a receiving device, transmitting parameters of the transmitting device and receiving parameters of the receiving device

- being variable (Figures 3, 4 and column 9, lines 1-8 and lines 28-41).
2. The transmitting parameters are
    - a) the transmitting frequency and/or
    - b) the transmitting capacity and/or
    - c) the modulation amplitude and/or
    - d) the azimuthal width of the emitted field  
(Figures 3, 4 and column 8, line 19 through column 9, line 8).
  3. The receiving parameters are
    - a) the receiving frequency and/or
    - b) the receiving sensitivity (= reduced range, Figures 3, 4) and/or
    - c) the azimuthal width of the received field  
(Figures 3, 4 and column 8, line 19 through column 9, line 8).
  4. A method for controlling the transmitting and receiving parameters of the radar sensor, the transmitting parameters and/or receiving parameters being changed as a function of the driving condition of the vehicle (Figures 3, 4 and column 9, lines 1-8 and lines 28-41).
  5. The following enter into the driving condition:
    - a) the speed (Figures 3, 4 and column 9, lines 28-41) and/or
    - b) assistance functions selected by the driver and/or
    - c) the position of the vehicle (Figures 3, 4 and column 9, lines 1-8) and/or



- d) the installation location of the radar sensor  
(Figures 3, 4 and column 9, lines 1-8 and lines  
28-41).
- 8. the width and shape of the antenna characteristic is  
changed (Figures 3, 4 and column 8, line 19 through  
column 9, line 8 and lines 28-41).
- 9. The antenna characteristic is changed by switching  
elements at the high-frequency level (Figures 2, 3,  
4, 8A and column 8, lines 47 ff.).

It must be noted that even if Claims 2, 3 or 5 were  
restricted to variants (and/or) respectively not  
disclosed in D4, their subject matter in light of  
document D4 in an overall view with general technical  
knowledge or one of the documents D2, D4-D7 is not  
regarded as inventive.

2.6 Furthermore, in combination with general technical  
knowledge or in combination with D6 or D7, D4 renders the  
features of **Claims 6, 7 and 10** obvious:

- 6. The speed resolution of the radar sensor is changed.
- 7. The distance resolution of the radar sensor is  
changed.

From D4, column 6, lines 27-49 (FMCW, FFT) and the  
different ranges of the antenna characteristics it  
becomes immediately clear to one skilled in the art that  
switching the ranges has the consequence of a change of  
the speed (Doppler) and distance resolution unless in the  
FFT the number of bins (normally 512) is changed at the  
same time.



10. The antenna characteristic is changed by digital processing in the baseband.

These features are also well known in the technical world. Thus D6 and D7 show a radar having switching HF elements and having digital beam shaping in the baseband (FFT): D6, Figure 1, column 2, lines 30-57; D7, Figure 1, 5, [0001, 0002, 0020 ff.].

- 2.7 Document D5 also discloses the subject matter of **Claims 1-3** (see especially column 7, lines 1-29 and Figures 5, 7, 9). Furthermore, D5 anticipates the subject matter of **Claims 6 and 7** (column 6, lines 7-25, FMCW, FFT).

- 2.8 It must be noted that the entire application is made up of a mere accumulation of properties desirable for a modern ACC radar, which are merely gathered from the related art and represented without any functional or technical context.

**Re Point VI:**

Document D1 represents an older European legal decision and an intermediate publication, which is drawn upon at least for novelty objections against the claims mentioned in the search report in the regional phase before the EPA (Article 54 (3,4) EPC or Article 54 (1,2) EPC if the priority of the present application is not valid for the respective subject matter).

**Re Point VII:**

- a) The requirements under Rule 6.3 b) PCT are not fulfilled, since the independent Claim 1 (and 4) is

not written in the correct two-part form, with regard to the closest related art of D2, D3 or D4.

- b) The requirements according to Rule 5.1 (a) (ii) PCT are not satisfied since publications D2-D7, which belong to the relevant related art, are not acknowledged in the description.